

Performance Maintenance Protocol

ACQUITY UPLC® TUV Detector

<i>Serial Number/ Firmware Version:</i>	AO9UPT635R 1.60.2273 (10 Aug 2013)
<i>Date:</i>	29 Dec 17
<i>Performer:</i>	Mohammad Shamsul



Performance maintenance

Goal

This performance maintenance protocol is a guide to performing maintenance tasks on your system. Packaged as part of the performance maintenance kit, it is intended to ensure optimum performance and an uninterrupted period of trouble-free operation.

Schedule

Waters recommends that performance maintenance visits be performed once a year. Systems under heavy use or using aggressive solvents will need more frequent maintenance. For detailed maintenance schedules, refer to the appropriate operator's guide(s) located on the Waters web site. Failure to follow the maintenance schedules as described in the operator's guides may result in unreliable operation and inaccurate laboratory results. For some protocols, optional tests can be performed by Waters field service engineers for added confidence and reliability.

Safety considerations

Some protocols may involve removing instrument covers, exposing the performer to high voltages, high currents, and moving parts. This presents risks of electric shock and/or damage to the instrument. To reduce these risks, Waters recommends that these protocols be conducted by certified Waters field service engineers, who have access to the latest information on Waters products. Waters does not advise and is not responsible for an unqualified performer initiating actions that they do not understand. If there is any doubt on the part of the performer, a Waters certified field service engineer should conduct the performance maintenance activity.

Waters Quality Parts

Waters designs and manufactures Waters Quality Parts® to the same strict regulatory standards (ISO 9001:2008) as your high-performance Waters systems. Waters recommends using Waters Quality Parts for all maintenance activities. Failure to use Waters Quality Parts may compromise laboratory results and reliability.

Customer education

Waters offers several operation and maintenance courses for ACQUITY® UPLC®, Alliance® HPLC and MS systems as well as courses designed to help you maintain professional competency and further your knowledge in Chromatography, UPLC, Informatics and Mass Spectrometry. For more information on available training courses from Waters Educational Services please visit the Waters web site.

Compliance services

Waters Compliance Services help you achieve and maintain the regulatory compliance of your LC and MS instruments and software with a combination of expertise, compliant-ready systems and software, and a portfolio of services to ensure that you have quality data, consistently. To learn more about these services, please visit the Waters web site.

General tasks

Use the following guidelines when conducting performance maintenance visits. This information is intended to be a guide only. For example:

- If a particular module has been recently serviced, it may need only testing and replacement of fewer parts.
- Not all procedures apply to all instruments (specify NA in the Comments section if the procedure does not apply).
- If the instrument fails to perform adequately during pre-performance maintenance checks, further service may be required beyond the scope of this protocol. Such service may incur additional parts and labor charges.

The following table lists the general tasks to be performed during a performance maintenance visit. Perform and confirm the steps listed for each procedure and record any comments that you have about the results at the end of each section.

For detailed instructions and a list of the necessary tools, refer to the Operator's Guide located on the Waters website.

Inspect	Maintenance tasks	Post-performance maintenance checks
Firmware version ¹	Lamp	Initialization diagnostics
Fan (inspect from the outside of instrument)	Lithium battery ²	
Flow cell		
Review error logs		

¹ Firmware upgrades, if required, should be performed by a Waters field service engineer prior to beginning performance maintenance. Firmware upgrades may require re-qualification of the upgraded instrument if it is in a regulated environment.

² Batteries replaced by Waters field service engineers only. Change the battery only for older style TUVs that use Performance Maintenance Kit WAS081142. The new style ACQUITY TUV using kit (201000186) does not include a battery.

Inspect

Firmware version

Confirm what firmware versions are installed. Update if required.

From the ACQUITY Console:

1. Click **TUV** in the Systems tree.
2. From the menu bar, click **Configure > View module information**.
3. Check the firmware version and note it on the cover page.

Firmware check complete.

☒ Yes ☐ No ☐ N/A

Comments: N/A

Fan

To inspect the fan:

1. Observe the fan on the rear of the TUV.
2. Ensure that the fan grate is clear of debris and dust. The fan should be blowing outward.
3. Clean if necessary.

Fan inspection complete.

☒ Yes ☐ No ☐ N/A

Comments: N/A

Flow cell

Inspect the flow cell for leaks.

Flow Cell inspection complete.

☐ Yes ☐ No ☒ N/A

Comments: Unable to check for leaks due to limited capabilities
of tester

Review error logs

To review the error logs:

1. From the Run Samples window in Empower or the Inlet Editor window in MassLynx, click the **ACQUITY Console** icon in the Sample Manager control editor.
2. In the system tree, click **ACQUITY UPLC System**.
3. Click on **Logs** to review error logs.

Review error logs complete.

☒ Yes ☐ No ☐ N/A

Comments: No error found.

Maintenance tasks

The following procedures are routinely performed as part of the performance maintenance. Waters Quality Parts® have been used to replace/rebuild all parts.

- Lamp
- Lithium battery

☒ Yes ☐ No ☐ N/A

Comments: Replaced lamp P/N: 402000351 due to lamp expiry
hours.

Post-performance maintenance checks

Initialization diagnostics

Turn on power, allow instrument to complete and pass on-board software checks.

Initialization diagnostics check complete.

☒ Yes ☐ No ☐ N/A

Comments: Initialization completed.

Performance maintenance confirmation

I confirm on behalf of _____	
_____ <i>Company Name</i>	
that this performance maintenance procedure has been satisfactorily completed on: _____	
_____ <i>Serial No.</i>	
Signed: _____	Date: _____
_____ <i>Customer</i>	
_____ <i>Type Name</i>	
I certify that the installation has been successfully completed.	
Signed: _____	Date: _____
_____ <i>Waters Engineer</i>	
_____ <i>Type Name</i>	
Comments: _____	

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Form Number: WAT-145/00 (WI-WAT-002)

Preventive Maintenance

Appendix 1: Preventive Maintenance Record

Date: 29 Dec 17
Equipment I.D.: 91404
Due Date:
Interval (Months): Yearly
Procedure: 735001356 / 715000954

Performer: Mohammad Shamsul
Equipment Name: AcQuity UPLC TUV Detector
Location: Flex (Kallang Place)
Next Due Date:

Measurements:

Equipment Used	Serial Number	Calibration or PM Date

Procedure Step	Nominal (Include Tolerance)	As Found Result	As Left Result	Comments

Preventive Maintenance:

Procedure Step	Action(s) Taken
Inspect	Inspection on Firmware version, Fan, Flowcell and review error logs
Maintenance tasks	Replacement of lamp p/n: 402000351
Post-performance Maintenance	Turn on power and allow instrument to complete and pass

Verification Results: Pass ☒ Fail ☐

Notes:

No field should be left blank; Insert "N/A" if Not Applicable

Place Expired Label Here

Currently installed lamp:

State: On

Good Ignitions: 0

Total Ignitions: 0

- 1: Installation Date: 19May11
Serial Number: 000067443
Hours: 3705.23
- 2: Installation Date: 24May12
Serial Number: 000088200
Hours: 15198.25
- 3: Installation Date: 20Jan15
Serial Number: 30556
Hours: 4524.83
- 4: Installation Date: 04Jan16
Serial Number: 67609
Hours: 6002.38
- 5: Installation Date: 10Jan17
Serial Number: 000093276
Hours: 5751.42
- 6: Installation Date: 29Dec17
Serial Number: 000129835 (Current)
Hours: 0.00

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INSTRUMENT FINAL TEST RECORD

Part Number:	186015028	Description:	AcQuity UPLC TUV Detector
Tested By:	MOHAMMAD SHAMSUL	Date of Manufacture:	12/29/2017 6:40 PM
Serial Number:	A09UPT635R_12292017640	Control Number:	NA
Software Revision:	1.60.2273	Factory Order:	NA

1) Electrical Safety

Ground Continuity

PASS ☒ FAIL ☐

2) Drift @ 230 nm

(<= 375 μ AU) - Actual:

26u

AU

PASS ☒ FAIL ☐

3) Noise @ 230 nm

(<= 5 μ AU) - Actual:

5u

AU

PASS ☒ FAIL ☐

4) Dual Noise @ 230/280 nm

(<= 75 μ AU) - Actual:

8u

AU

PASS ☒ FAIL ☐

Instrument Result: PASS ☒ FAIL ☐ Signed:  (246394)

Date: 29/12/17

Notes: Replaced lamp (PLN: 402000351) due to lamp expiry hours.

End of data

Drift Count: 1

Noise Count: 3

Dual Noise Count: 1

230 nm Energy [nA]: Sample Energy: 84.168571 Reference Energy: 121.371193

This Test Record and any data contained within it are proprietary to Waters Corporation and must be retained by Waters for the time period prescribed in its Quality Records Retention Policy. If any of the individual tests noted above fail; a note must be referenced that details the work performed to correct that specific deficiency. An overall failure indicates a special circumstance in which case a complete retest is to be done. A second form is required to document that testing; the initial form must be attached and retained